

1 1. A method of ensuring that a first component of a distributed system that normally has  
2 access to certain messages from other components thereof is additionally aware of a state  
3 of one or more of the other components that is relevant to an action performed by the first  
4 component,

5 the method comprising the steps practiced in the first component of:

6 receiving augmented ones of the certain messages, each of the augmented certain  
7 messages having been augmented by an other component to additionally contain  
8 information indicating the relevant state of the other component;

9 for at least some of the other components, retaining the relevant state from an  
10 augmented message of the other component; and

11 performing the action as determined by the retained relevant state.

1 2. The method set forth in claim 1 wherein:

2 the messages are part of a transaction;

3 the action belongs to the first component's portion of a protocol for ensuring that  
4 the results of the transaction are consistent in the components;

5 in the step of receiving augmented ones of the certain messages, the information  
6 indicating the relevant state indicates whether the transaction will modify data in the  
7 other component; and

8 in the step of performing the action, the first component optimizes the protocol as  
9 determined by the retained state.

1 3. The method set forth in claim 2 wherein:  
2 the protocol is a two-phase commit protocol;  
3 the first component is the coordinator for the protocol; and  
4 in the step of performing the action, the first component sends a message that  
5 aborts the transaction to an other component when the other component's retained state  
6 indicates that the transaction does not modify the data in the other component.

1 4. The method set forth in claim 3 wherein:  
2 the distributed system is a distributed database system and the components are  
3 database systems therein.

1 5. A method of ensuring that a first component of a distributed system that normally  
2 accesses messages that belong to a transaction and that are received from other  
3 components thereof is additionally aware of a state of one or more of the other  
4 components that is relevant to the transaction,  
5 the method comprising the steps practiced in the other component of:  
6 determining the relevant state; and  
7 augmenting certain of the messages sent in the course of the transaction with state  
8 information indicating the relevant state of the other component,  
9 the first component determining an action to be taken with regard to the transaction from  
10 the state information.

1 6. The method set forth in claim 5 wherein:

2 the relevant state indicates whether the transaction will modify data in the other  
3 component.

1 7. The method set forth in claim 6 wherein:

2 the protocol is a two-phase commit protocol; and

3 the other component receives an abort message of the protocol when the relevant  
4 state indicates that the transaction will not modify the data in the other component.

1 8. The method set forth in claim 7 wherein:

2 the distributed system is a distributed database system and the components are  
3 database systems therein.

1 9. A method of executing a two-phase commit protocol for a transaction, the transaction  
2 involving a coordinator and a cohort and

3 the method comprising the steps performed in the coordinator of:

4 receiving a message required for the transaction from the cohort, the message  
5 being augmented with state information indicating whether the transaction modifies the  
6 cohort's data;

7 retaining the state information for the cohort; and

8 if the state information for the cohort indicates that the transaction does not  
9 modify the cohort, sending an abort message of the two-phase commit to the cohort.

1 10. A method of executing a two-phase commit protocol for a transaction, the transaction  
2 involving a coordinator and a cohort and  
3 the method comprising the steps performed in the cohort of:  
4 augmenting a message that the cohort sends to the coordinator as part of the  
5 transaction with state information indicating whether the transaction will modify the  
6 cohort; and  
7 responding to messages received from the coordinator as required by the commit  
8 protocol,  
9 the coordinator sending a message of the commit protocol to the cohort as determined by  
10 the state information.

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